

Baker (W. H.)

21/L

Electrolysis in Gynecological
Surgery.

BY

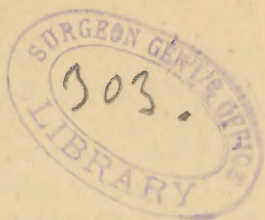
WILLIAM H. BAKER, M. D.,

ASSISTANT PROFESSOR OF GYNECOLOGY, HARVARD
UNIVERSITY; SURGEON TO THE FREE HOSPITAL
FOR WOMEN, BOSTON.



REPRINT FROM VOLUME XI
Gynecological Transactions.
1886.





ELECTROLYSIS IN GYNECOLOGICAL SURGERY.

BY WILLIAM H. BAKER, M. D.,

Boston.

IN the rapid strides which gynecological surgery has made in the past quarter of a century, electricity has taken but a small part. The reason of this is twofold: *First*, this agent has been generally so little understood, and in its application to medicine and surgery so much less has been known about it, that it has not received its appropriate share of investigation and clinical application. *Second*, the more exact means of accomplishing results with the knife, which, although many times, more immediately dangerous, yet are so brilliant at the time as to far overshadow this more slow and inexact method.

Another thing which has retarded the progress which should have been made in the application of this valuable agent, is the fact that only a very small percentage of practitioners have possessed the requisite mechanical skill and ingenuity to understand the care and use of batteries for its generation. Nor is this surprising, when we consider the complex arrangements which were usually sold for the use of the physician and surgeon. Again, the cases were comparatively few which, in the practice of most general practitioners, would call for this method of treatment, and he was indeed fortunate who could make the battery work at all satisfactorily when the occasion arose which demanded its use.

It is then only since the practice of medicine and surgery has been drifting toward specialties on account of the extent of the field occupied, as well as the desire on the part of some to pursue the line of study in some depart-

ment to a greater extent than was possible in general practice, that greater inquiries have been made into the therapeutical agency of electricity, and its value recognized by the whole profession.

It is not my purpose to consider the different currents of electricity used in medicine, but to confine myself to what we know as the constant current, or galvanism. Nor would I extend my remarks beyond the domain of gynecology, which more immediately interests the Fellows of this Society. Even here the usefulness of this agent may be so extended and interesting, as shown by one of our esteemed Fellows in the *American Journal of Obstetrics* for December, 1885, and also by Dr. Martin, of Chicago, at the meeting of the American Medical Association, May 5, 1886, that again the line of discussion must be drawn a little closer, and its consideration restricted to its use in the treatment of fibroid tumors of the uterus, and to chronic circumscribed perimetritic effusions.

Nearly all observers agree as to the very large percentage of women who are afflicted with the first of these maladies, and the number is far from small which, from one reason or another, call for interference. The second of these diseases mentioned, or perimetritic effusions, while not as frequent as the first, must surely be ranked high among the diseases of women, and perhaps *more* frequently applies to the gynecologist for treatment on account of the greater suffering occasioned by its existence.

Although a great deal was being done twelve or fifteen years ago for that class of fibroids of the uterus which projected into its cavity, and, to some extent, when interstitial, by enucleation, yet there were very many cases where this was inapplicable, and on these the surgeon looked with longing desire to extend his skill in laparotomy to meet the exigencies of the case. The instances, however, were so few where the life of the patient was endangered by the growth, that the operation of hysterectomy was slow in establishing itself. About the time mentioned, 1871 to 1874, ergot was

being used considerably for the purpose of arresting the growth of the fibroid, either by mouth, rectum, or subcutaneous injections; this, however, was found to have less effect in the class of subperitoneal growths than in those located nearer the inner portion of the uterine wall. The wise encouragement was held out to some who were fortunately near the climacteric period, that with the establishment of the menopause the growth would diminish, and possibly disappear; yet its very existence often made this period a protracted one, and the patient oftentimes became worn out with suffering, and, thoroughly discouraged, was ready to submit to any means which offered her a promise of immediate relief.

The operation of hysterectomy is now too well established as a means of cure for large subperitoneal and interstitial fibroids, and, in the hands of a few, is too successful for me to offer, as a substitute, electrolysis; yet it was successfully employed before the above-named operation became popular, and may still be found to fill a very appropriate place in certain cases of such fibroids. By those less skilled in laparotomy it will be found most useful; while in the practice of those most skilled in abdominal section, cases may arise where it may be wisely used as a substitute. For instance, a patient is near the menopause, tumor not so large as to endanger life, yet is the source of considerable suffering and possibly hemorrhage, is unwilling to undergo an operation which specially endangers life. Again, the patient, for family reasons or otherwise, cannot undergo an operation which endangers life. Or yet again, the knowledge that she was to sustain a loss of the greater part of the uterus, and the absolute certainty of her sterility thereafter, would lead her to decide against it, no matter if she had never been pregnant; it may have been the hope of her life, and in hysterectomy she foresees the utter annihilation of that hope. To all of these, and more, electrolysis offers a means of relief with a minimum amount of danger.

The first to suggest and successfully apply the use of electrolysis for fibroids of the uterus was our esteemed ex-

president, Dr. Gilman Kimball, who was assisted by Dr. Ephraim Cutter, in the early cases thus treated, the latter gentleman having devised a battery and electrodes for the purpose. Its first application was made in a case of a large subperitoneal fibroid, December 26, 1871, and reported, with other cases by Dr. Kimball, in the *Boston Medical and Surgical Journal* of January 29, 1874. In the same journal for February 17, 1876, Dr. Cutter figures and describes this battery, which was composed of eight cells of large size, nine inches by six inches each, of carbon and zinc plates. He also reports twenty-five cases treated by electro-puncture through the abdominal walls, with no death, although in a later number of the same journal he refers to one fatal result in the practice of Dr. Kimball. In these cases the results were very gratifying. In some, the tumors apparently entirely disappeared; in others, the size was greatly diminished, and in but three was no change noted.

Both Drs. Kimball and Cutter seemed to have considered it best to make several applications at short intervals, generally of from a few days to a week or two, and the length of each treatment varying from three to fifteen minutes. In the early cases, ether does not seem to have been given; in the later ones, however, the patients were generally anesthetized.

My attention was first called to the subject by reading the article of Dr. Cutter, and I determined to give it a fair trial. Not being an expert in the use of electricity, I was fortunate in securing the co-operation of Dr. S. G. Webber, whose knowledge and skill in the use of this agent was well recognized; and until I had practically learned from him the proper use of the galvanic battery in these cases, he continued to give me his advice and assistance.

From him I learned that Dr. Cutter's battery was, for the purpose we desired, open to serious objections, as follows: The resistance of the body or of the tumor to the galvanic current being great, all authorities agree that the size of the cells should be moderate, or small and numerous, in order

that the intensity of the current may be increased, and thus the resistance overcome; whereas, in the battery described, the surface of the plates is so great that the quantity of galvanism generated is large, which is valuable when thermic action is desired, but the intensity of the current is so low that the power of such a battery in conveying a galvanic current through a tumor would be small. We therefore substituted a Flemming and Talbot battery of thirty cells, and electrodes of steel about nine inches in length by one sixteenth of an inch in diameter, japanned to within one inch of the tip, which was gold-plated. I have since used various galvanic batteries for this purpose with equally good effect, the important points in its application, so far as appliances are concerned, being that the battery be made up of from twenty to thirty cells of moderate size, and that it is in good working order; that the electrodes are properly japanned and of sufficient strength, and that the connecting wires are perfect. These things being assured, my experience has taught me:

1. That it is best to select a time for its application other than during, or for a week previous to, the menstrual period.
2. The patient should always be under the influence of an anæsthetic.
3. It is better to use electrolytic needles for both positive and negative poles.
4. We should be absolutely sure of the thorough cleanliness of the needles.
5. The needles should be deeply buried in the tumor, in order that the current should be perfectly insulated from the parts outside of the growth.
6. The insertion of the needles should be made at the most prominent points of the tumor, whether through the abdominal parietes, vaginal vault, or interior of the uterus, and that the two needles should not be too nearly approximated.
7. Both electrodes being properly placed in the growth, one, it may be, externally and the other internally, it matters

not whether the positive or the negative needle is the internal one.

8. After the insertion of the needles, the circuit should be completed, and, beginning with four to six cells, we should, within two or three minutes, gradually increase the number to from eighteen to thirty cells of an ordinary battery, the number required varying much with the cleanliness of the battery and the freshness of the fluid. A much more exact means, however, would be to be governed by the indications of the galvanometer.

9. The length of time occupied in the application should be from ten to twenty minutes, which should be determined by the character of the pulse, which should be continuously felt, and when found to be much more slow than normal and weak, the current should be either entirely discontinued, or the number of cells in use diminished.

10. There should be no interruption of the current during the application.

11. Before disconnecting the battery, the current should be gradually diminished.

12. The current should be disconnected at the battery before the removal of the electrodes.

13. Under no circumstances is the application to be made at the surgeon's office, and the patient allowed to return home when sufficiently recovered from the ether.

14. After the application, the patient should be put to bed, where she is to remain for a week.

By following such a method of procedure, I have never seen any shock follow the application, and it will rarely be found that the patient will require any opium for the relief of pain. The convalescence is usually unaccompanied by pain or fever, and the only discomforts which the patient is likely to complain of are, some slight soreness at the sites of the punctures, and the usual ones of position from lying in bed.

It may be said that the rest in bed for a week is unnecessary, to which I should reply, that by following such a course

I have never had any thing but a good convalescence ; and as accidents, and even deaths, have been reported by some, where I fear such restrictions were not enjoined, I prefer to be on the safe side, and keep my patient quiet.

I cannot agree with all the writers I have seen on this subject, among whom, in addition to those already referred to, may be mentioned Dr. Apostoli, of Paris, and Dr. Mundé, of New York, that it is wise or necessary to make frequent applications of this treatment to these cases ; for I have found that a single treatment is sometimes all that is necessary to greatly diminish the growth, and have never found it necessary to make more than three applications, and that only in a single instance. My rule is, after the first application to wait one, two, or three months, and see just how much is to be gained by that treatment before resorting to the second. I think that in electro-puncture there is danger of doing an unnecessary amount of work, and that by too frequent applications there may be an additional risk to the patient from shock or other complications.

In the application, however, of electrolysis to a fibroid after the method described by Dr. Apostoli, I can readily understand why it is necessary to give frequent treatments, extending over a long time. Allow me to give in substance a description of this method. An electrode of clay, moistened, or what the potter would term a biscuit, to which the negative pole is attached, is placed over the abdomen ; this electrode is of large size, and is held firmly in position by the two hands of the patient, she being in the recumbent position ; the positive pole is now attached to a form of uterine sound with platinum tip, which is the other electrode, and is insulated by a piece of rubber tubing to protect the vagina, only so much of its extremity being exposed as shall extend the length of the uterine canal. The battery is then connected, and as great an intensity as the patient can well endure is used, which degree is indicated by a galvanometer made expressly for this purpose, and capable of registering twice the amount of the ordinary instruments. This is con-

tinued from five to fifteen minutes at each sitting, and is to be repeated once or twice a week, in the intermenstrual period, for a long time.

In this method, the amount of tissue through which the galvanic current must pass is necessarily much increased over that where, in electro-puncture, the needles pass directly through all the healthy tissue overlying the tumor, and the current has only to pass through its substance. By this method, then, the resistance to be overcome by the battery, in order that the current may effectually flow, is very much greater, inasmuch as the tissues of the body offer an almost immeasurably greater resistance than the same extent of metal used in the electrolytic needles; the first being an exceedingly poor conductor to the galvanic current, and the last an exceedingly good conductor.

It is not surprising, then, that, following this method, a large number of sittings should be necessary, and a much greater intensity of current required. In fact, it is most encouraging that such results as Dr. Apostoli is able to report can be obtained, and he is most certainly to be congratulated on his success. That he is satisfied with a less perfect result than some of our American operators, would appear from his saying that he does not expect to make the tumor entirely disappear, his aim being to diminish its size. It certainly has the advantage of being very much less of an operation, its application being made in the surgeon's office, and the patient returning home within an hour or two. It is my opinion that the tediousness of frequent applications, extending over so long a time, more than offsets the increased inconvenience and risks of electro-puncture.

My experience in the application of electrolysis in the treatment of fibroid tumors of the uterus extends to fourteen cases, the results of which, so far as relieving the suffering dependent on the existence of the growth, have been highly satisfactory, and so far as arresting, diminishing the size of, or causing the entire disappearance of the growth are concerned, fairly satisfactory, viz.: In one case the tumor en-

tirely disappeared. In twelve cases the tumor diminished one third to one half in its size; in one of these cases, however, there is now some indication of a returning growth, accompanied by suffering. In one other case, although the suffering was greatly relieved by the treatment, there was little or no effect on the size of the tumor. In no case did death occur, nor was the convalescence other than good. The symptoms presented by patients suffering from these neoplasms are so familiar to you all, and the reported individual cases by different operators are now so many, differing so little in essential points, that a rehearsal of cases is not only uninteresting but un instructive, and has therefore been omitted.

Prominent among others who have reported cases of this class, treated by this agent, who have not already been referred to, are Dr. Semeleder, of Mexico, Dr. Mesière, of Paris, and Dr. Freeman, of Brooklyn. I am well aware that two of the reporters have noted death as the result in certain cases treated substantially by this method, yet I do not think that this should argue too strongly against its adoption in proper cases. There is scarcely an operation known in surgery, however slight, where death has not been the unexpected result in exceptional cases; and to my mind, in the present instance, such a result would be much more likely to depend upon some negligence on the part of the patient, or possibly upon too much freedom allowed by the surgeon subsequent to the operation, rather than upon the operation itself, if at all carefully done.

In considering the subject as to how the galvanism affects the fibroid to bring about the arrest in its growth, its diminution, or, so far as we are able to clinically determine by physical examination, its entire disappearance, we can perhaps theorize for a long time without arriving at any entirely satisfactory explanation. We all know that to this particular current or form of electricity a special chemical or catalytic action is ascribed, but just what this change is that takes place in the fibroid, or what action it establishes in its structure, which leads to its death, disintegration, or resolution, is by no

means well understood. My own opinion is, that electrolysis establishes a process similar to that which occurs in some instances without the intervention of any outside agency that we are aware of: *i. e.*, an interstitial inflammation of the connective tissue; and in its resulting cicatricial contraction, the muscular fibers are so compressed that fatty degeneration occurs, which being absorbed, the growth diminishes in its volume or entirely disappears. But the question might be raised, If this is the explanation of the process, why would not simple puncture accomplish all, without the galvanic current? To which I should reply, that simple puncture would undoubtedly set up interstitial inflammation in a very slight and localized degree, which, however, in an exceptional, case may be general, and quite sufficient to accomplish all; as in one case which I remember in the practice of the late Dr. Peaselee, where an aspirator-needle had been thrust into a fibroid to establish the diagnosis. In order, therefore, to insure as universally as possible this action, it is necessary to depend upon the galvanic current as the all-important agent. This is most conclusively shown by the cases of Dr. Apostoli and Dr. Franklin H. Martin, where there was no electro-puncture. Interstitial inflammation resulting from simple puncture is much more dangerous from extension to other parts, and may thus become uncontrollable, and is certainly to be avoided; whereas, when combined with galvanism, properly applied, it very rarely will show any tendency to extend beyond the limits of its investing capsule.

Why, in all the cases reported, electrolysis has been in the large majority of cases so far successful, yet in a limited number has shown very little or no effect, is a most interesting point of inquiry, and subject for future investigation. The only explanation that I can offer is, that the galvanic current has much less effect upon the muscular than upon the connective tissue, and that it possibly may be found that in those cases which are more truly myomas the galvanic current has less effect than in those whose structure is more strictly that of a fibroma.

In the treatment of perimetritic effusions by electrolysis, much less has been done. In the consideration of this part of my subject, let me be understood at the start to limit its application to those cases which are thoroughly chronic in character. So long as there is any acuteness present in the inflammatory process, just so long would it be hazardous to attempt any manipulative interference; but when this stage is well over, and so thoroughly over that we can feel that there would be little or no danger in aiding the absorption of any remaining inflammatory products by the usual methods of painting the vaginal vault with iodine, internal massage, and the like, at such a time I claim that in electrolysis we have a valuable agent to help on this process of resolution. We all know with what difficulty such a mass of effusion is made to disappear in many instances, and what patience and good judgment is required on the part of both physician and patient to bring about its absorption. We also recognize the fact, that so long as this mass remains in the pelvis, it so cripples and impairs the natural movements of the uterus, as well as interferes with the proper circulation in that organ, that it predisposes the patient to renewed acute attacks. Anything, then, which can help on the disappearance of this effusion, will find its appropriate place in the treatment of some of these most tedious cases. My experience in the application of electrolysis in this class is limited to a single case, which, however, was so interesting and instructive to me that I cannot refrain from giving it in full.

Mrs. C. C., a colored woman of twenty-eight years of age, married, and had had one child three years before. No abortions. Had complained of existing trouble since birth of child. Family history good. Menstruation had begun at the age of fifteen, continued regular for five years, then became irregular, occurring each two weeks to three months. Amount was not excessive. Always suffered considerable pain before and during menstruation, occasionally confining her to bed. She was attended in her labor by a midwife, who kept her in bed a week, and then allowed her to get up. After trying to

be about for four or five days, she was compelled to go to bed again, on account of pain in the uterus and back. From that time to the date of her admission to the Free Hospital for Women (November 16, 1885) she was very much of an invalid, spending a great part of the time lying down, on account of the pain occasioned by trying to be about.

Bowels were irregular, and micturition difficult and at times painful.

Examined under ether, the diagnosis of chronic perimetritis was made, the effusion being mostly behind and to the left side of the uterus, which organ was anteflexed. The mass, which was solid, was about the size of the fist behind the uterus, and one half its size to the left side, and held the uterus immovably in its malposition. Ether was given in order the better to establish the diagnosis, as without it, on account of the local sensitiveness and abdominal rigidity, it was a little uncertain with what we had to deal.

For six weeks everything was applied which is ordinarily made use of in such cases, such as hot vaginal injections, applications of Churchill's tincture of iodine to the vaginal vault, glycerine dressings, and internal massage. At the expiration of this time there was somewhat less sensitiveness, although nothing had been gained in diminishing the size of the effused mass. In a general way, however, the patient felt much improved. For the next two months the treatment consisted of hot vaginal injections twice a day, Churchill's iodine to the vaginal vault each second day, and on alternate days the galvanic current, applied for five minutes, the positive electrode being placed in the posterior *cul-de-sac* of the vagina, and the negative pole over the hypogastrium, using as many cells as could be tolerated. This caused a disappearance of nearly all sensitiveness, but the mass of inflammatory product showed very little evidence of yielding. The patient was therefore etherized, and the positive electrolytic needle inserted through the posterior *cul-de-sac* into the mass, while the negative electrolytic sponge was held pressed deeply into the pelvis above the pubes, depressing the abdominal walls. The current was applied for ten minutes, eighteen cells of the battery being used. There was no shock or other unpleasant complication

following this operation, and in one month from the date of it, after a careful examination, scarcely a trace of the effusion could be felt, and the patient, feeling perfectly well, was discharged from the hospital, cured.

I can hardly conceive of a better case than the one just reported to test the value of electrolysis. We had apparently gained all that could be accomplished by the usual methods, yet, although the patient felt generally much improved, we knew from physical examination that she was not well, and that if she left the hospital in the state she was in, with the remaining mass of effusion still there, it would be very likely to start up a fresh attack of inflammatory action on the first and slightest provocation; and, judging from other cases of a similar nature, she would be very likely to spend much of her time in the hospital, suffering with repeated attacks of the same disease. The highly satisfactory result obtained encourages me to give it a more extended trial in the future.

I think that in most of the cases of this class we shall find it unnecessary to use electro-puncture, for the application of the galvanism in the way that was first practiced in the case reported will be found to be sufficient—*i. e.*, by applying the positive electrode or sponge to that portion of the vagina nearest the inflammatory product, and the negative pole to that portion of the abdominal parietes immediately over the effusion. This method should always be tried before resorting to electro-puncture, for the following reasons:

1. It does not require the use of an anæsthetic.
2. It is much less of an operation than by electro-puncture, and will do away with the slight risk which always accompanies even the wounding of small surfaces.

I am well aware that a current of much greater intensity than in electro-puncture will be required, and that in some obstinate cases that operation may have to be resorted to in order to effect a cure. In such trying cases, however, I believe that the insertion of the positive electrolytic needle through the vaginal vault into the mass will be found much more

safe than carrying the positive electrolytic sound into the uterine cavity to the fundus, as practiced by some authorities.

This method of treating old effusions in the pelvis may seem harsh and unwarrantable to many, and I readily confess that, had it not been for my previous experience in the application of electro-puncture to fibroid tumors of the uterus, and seeing the universally good convalescence of my patients, I might have felt the greatest reluctance in its use here. All I would ask of those who have had no experience with its use, in either of the diseases specially referred to in this paper, is, that before hastily condemning it they give it a fair trial in a few properly selected cases.

In general summary, I would offer the following:

1. Electrolysis is a useful agent in the treatment of certain cases of fibroid tumors of the uterus, as well as of chronic circumscribed perimetritic effusions.

2. When applied to fibroid tumors of the uterus, electro-puncture is the most reasonable and efficient method.

3. In the treatment of fibroid tumors of the uterus by this agency, it is unnecessary to apply it often.

4. Cases of perimetritic effusions, which are to be treated by this method, should be selected with care in regard to the absence of all acute symptoms.

